

PATENT
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APPLICATION FOR UNITED STATES LETTERS PATENT

for

REMOTE AUTOMATED DOCUMENT PROCESSING SYSTEM

by

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FIELD OF THE INVENTION

SUMMARY OF THE INVENTION

A further object of some embodiments of the present invention is to provide a document processing system which obtains approval for payment of documents, such as checks, through the ACH system.

Another object of some embodiments of the present invention is to provide a
15 document processing system where information obtained from the documents is
stored in an image file.

Another object of some embodiments of the present invention is to provide a document processing system capable of processing all types of documents and interfacing with all types of outside accounting systems.

Another object of some embodiments of the present invention is to provide a document processing system which obtains information by performing full image scanning of documents and utilizes this information to determine additional information concerning the documents, such as the value of a document.

A further object of some embodiments of the present invention is to provide a
25 document processing system whereby the full image of the scanned document can be
communicated to a central office.

Other aspects and advantages of the present invention will become apparent upon reading the following detailed description and with reference to the drawings.

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substantially the entire image of each scanned document. A printer prints an authorization agreement on the checks and can also inscribe the transaction amount on the check. Also included is a conveyor for returning the checks with the agreement to the customer. The information scanned is communicated to a central clearinghouse
5 via a communication link.

According to another embodiment, an automated point-of-sale check processing system for processing customer transactions includes a document scanner located at a site of a customer transaction. The document scanner has a slot adapted to accept a document. After having obtained an authorization agreement from a
10 customer, the scanner obtains at least one image of the document. A communication link is coupled to a central clearinghouse and adapted to communicate information represented by at least one image to the central clearinghouse for processing the document.

15 BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings.

FIG. 1 is a block diagram of the components of a scanning system according to principles of an embodiment of the present invention.

20 FIG. 2 is a flowchart describing the operation of a scanning system according to principles of an embodiment of the present invention.

FIG. 3 is a block diagram of a remote scanner of a scanning system according to principles of an embodiment of the present invention.

FIG. 4 is a perspective view of a remote scanner of a scanning system
25 according to principles of an embodiment of the present invention.

FIG. 5 is a block diagram of a remote scanner of a scanning system according to principles of an embodiment of the present invention.

FIG. 6 is a block diagram of a remote scanner of a scanning system according to principles of an embodiment of the present invention.

30 FIG. 7 is a block diagram describing an image file according to principles of an embodiment of the present invention.

FIG. 8 is a flowchart describing the operation of a remote scanner of a scanning system according to principles of an embodiment of the present invention.

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FIG. 9 is a block diagram of a scanning system according to principles of an embodiment of the present invention.

FIG. 10 is a flowchart describing the processing operations performed on images or image files according to principles of an embodiment of the present invention.

FIG. 11 shows a block diagram of the components of a document and currency processing system with a single output bin according to principles of an embodiment of the present invention.

FIG. 12 is a top view of a document being scanned by the full image scanner
10 in the wide dimension.

FIG. 13 is a side view of a document being scanned by the full image scanner in the narrow dimension.

FIG. 14 is a perspective view of a compact document processing system according to principles of an embodiment of the present invention.

15 FIG. 15 is a sectional side view of the embodiment shown in FIG. 14.

FIG. 16 is a perspective view of a compact document processing system according to principles of an embodiment of the present invention.

FIG. 17 is a side cross-sectional view of the embodiment shown in FIG. 16.

While the invention is susceptible to various modifications and alternative forms, specific embodiments have been shown by way of example in the drawings and will be described in detail herein. It should be understood, however, that the invention is not intended to be limited to the particular forms disclosed. Rather, the invention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

Referring now to FIG. 1, the operation of the scanning system is now described. A plurality of remote scanners 10a, 10b, 10c, 10d are linked to a remote computer 12. In this application, use of the adjective "remote" means that the item (scanner, computer, etc.) is at a location separate from the central processing center. The purpose of the scanners, as will be described in greater detail later, is to obtain images from documents, process these images, and return the scanned documents to customers. The document is typically a check. It is contemplated, however, that other types of documents could be processed, such as coupon and loan payment

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computer stores the images or image files in a central memory storage which can be any type of common storage device.

Remote scanners 18a, 18b, 18c, 18d are all coupled to a remote computer 26. The remote scanners 18a, 18b, 18c, 18d are at a location 4 different from remote
5 scanners 10a, 10b, 10c, 10d, for example, at another retail location. The remote computer 26 stores images or image files obtained from remote scanners 18a, 18b, 18c, 18d in memory storage 24. The remote computer 26 is coupled to the central computer 18 via a communication link 22, such as the type described in connection
10 with the communication link 16. Although not shown, other scanner networks can be connected to the central computer in network arrangements as are known in the art. For example, various network architectures can be used to connect the scanner arrangements at a particular site and to connect particular sites together.

Referring now to FIG. 2, the operation of a scanning system according to one embodiment is now described. In some embodiments, the scanning system may be a
15 point-of-sale check processing system. At step 90, a customer fills out the amount and payee information on a document, such as a check. At step 92, the document, for example, the check, is stamped with an Automated Clearing House ("ACH") agreement. The ACH agreement may be printed on the document by the scanning system as described below in reference to FIG. 3. Alternatively, it is also
20 contemplated that the ACH agreement may be stamped automatically or manually onto the document. It is also contemplated that a separate document, such as a receipt, may be stamped with the ACH agreement or has the ACH agreement printed on it. This process would be similar to issuing a credit card receipt to be signed. An ACH agreement allows a bank to debit the customer's account through the ACH
25 method and then credit an account owned by the retail store. The ACH method utilizes electronic transfers as opposed to the conventional clearing path used by banks and other financial institutions in clearing a check. The retail store would have to convey transfer information regarding an account to be credited to the customer's bank. The retail store's account information may be included in the image of the
30 check that is transferred. For example, if the item scanned is a check, an endorsement stamp may be added to the image which includes the bank and account number which is to be credited. Alternatively, the bank information could be added to the file as a separate line item.

The ACH agreement may be printed on the document using a number of the methods as described below in reference to FIG. 3. In another embodiment, step 92 is eliminated and the customer only has to sign the document once. The scanning system would add to the image any other fields which were desired, *i.e.*, payee name and amount. Also, it is contemplated that a printer would then print this additional information on the document as a receipt, but such a step is not required.

Next, at step 94, the customer authorizes the transaction. This may be done via signing the document after the agreement has been printed on it, giving a verbal authorization, selecting a button on a communication screen, or signing an electronic signature pad. If a signature is used, it may be handwritten, stamped, or made via other conventional means, or may be, for example, an electronic signature. If verbal authorization is given, step 92 may be eliminated and the authorization need not be printed on the document. If verbal authorization is given, a printer may print "authorized verbally" or like terms on the document. Also, the image may be tagged with such indicia of authorization. At step 96, the check is placed into the scanner, for example, by a merchant selling goods or services to a customer, as discussed in connection with FIGS. 1, 3 and 4. Next, at step 98, the scanner, using full image scanning techniques, scans the check and obtains information from the check for use in the clearing and processing system. The scanner may scan for any indicia of cancellation. If some indicia of cancellation is found on the document (indicating that the document has already been processed), the process is terminated and the appropriate authorities may be informed. Also, if the document contains some cancellation, it is also contemplated that the document would not be returned to the customer but, instead, be held by the operator or issuing bank. At this point, the check images may be communicated via a communication link to a central clearinghouse (or central computer 18 as shown in FIG. 1) where the images are processed and payment authorization is made. Some indicia of cancellation is added to the check, either by the scanning system or by hand. Finally, at step 100, the check is returned to the customer, as described below.

Also, the check may be inscribed by a printer with the amount of the transaction, however, this is not required. This transaction amount may be keyed in by the operator using a traditional cash register or devices on the document scanning system. The merchant returns the check to the customer as the customer's receipt. In another embodiment, the check is kept by the business and a receipt is e-mailed or

agreement and the indication of cancellation is placed on the document 61 using hand stamps and/or separate printers. If a hand stamp is used to print the ACH agreement on the document, it is contemplated that the agreement would be worded as such to include both the ACH agreement as well as a promise to pay, thus, requiring the customer to only have to sign the document once.

In one embodiment, the scanner 58 houses a software program with optical character recognition (OCR) software which can compare the transaction amount written on the document 61 to the amount keyed in by the operator. The scanner 58 scans the document and the software identifies the amount printed on the document 61 from the image using OCR software or other conventional means. The system 10 is then able to compare the keyed transaction to the amount “read” by the scanner 58. In this way, errors between the keyed-in amount and the amount written by the customer are detected and can be communicated to the customer and/or the operator.

It is also contemplated that the OCR software could be utilized to read other
15 information from the document 61. In some embodiments, it may be desired that the
OCR read payor name, address, or any other information on the document 61.

With reference to FIG. 4, a perspective view of the remote scanner 50 is now described. An operator inserts a document 61 into a slot or opening 60. Information concerning the transaction is communicated to the operator via an operator interface 67, such as a display, a touch screen, or a video screen. The interface 67 can be a touch screen which can be used by the operator to communicate interactively with a central location. For example, the interface 67 can also be a communicational video screen which displays video images of the document as it was scanned. The screen may then prompt the operator to perform the next step, *i.e.*, accept, reject, retry. As stated above, the document 61 is typically a check, but may be other documents, as well.

A second interface 66 may be provided to display information to a customer. This interface may also be a video screen or a touch screen as described above. In one embodiment, this interface may include a touchscreen button for authorizing the ACH transaction. Also, the button may be a separate “OK” button. This way, the customer only has to sign the document once. A communication link 69 is used to connect the scanning system 50 to a network of scanning stations and/or to the central computer 18 as is described in reference to FIG. 1.

currencies deposited. The processor 292 may also compress the image data, as is known in the art, in preparation for transmission to an outside location and/or storage.

The amount of image data per document may vary depending on the size and nature of the document and the efficiency of the data compression and reduction for that particular document. To insure that no data is lost in the event that the volume of image data temporarily exceeds the transfer capacity of a data channel, such as a high speed data channel, a pre-channel buffer 294 is interposed prior to the data channel, which is connected to the controller 160. The capacity of the pre-channel buffer 294 is continually monitored by the controller 160 so that appropriate action may be taken if the buffer becomes overloaded. The compressed video image data is received by the controller over, for example, a high-speed data channel 296 and is initially routed to temporary storage. The pre-channel buffer 294 is preferably of a size capable of storing image data from at least several batches or runs of checks or similar documents, each batch or run containing several checks or documents. The controller 160 in the scanning system directs the full image scanner to perform the functions of analyzing the data. Alternatively, as discussed above, analysis of the data can occur at a central office computer or at a personal computer attached to the system.

A personal computer or alternate means may be used to create images of electronic documents that are electronic images only. That is, such documents may be created without scanning physical documents. In such a system, computer software electronically creates an image of a document, such as a check. A special printer (not shown) may be connected to the system to print documents with fields of interest. In this embodiment, an actual check is never scanned. An image of a check is created on the personal computer or on the scanning system 50.

A plurality of remote scanners may be connected in a "hub and spokes" network architecture as is known in the art. Likewise, other network architectures may be used. In order to prevent congestion, the image buffer on each document processing system stores data until polled by the controller or an outside accounting system. By "outside accounting system," it is meant to include the hardware and software associated with accessing, maintaining, tracking, and updating savings accounts, checking accounts, credit card accounts, business and commercial loans, consumer payments, and all other similar accounts at locations remotely (*i.e.*, not associated with the scanning system host computer) located from the full image scanners. The term includes three broad types of systems: systems where deposits

are made, systems where withdrawals are made, and systems where both deposits and withdrawals are made. Although the outside accounting system described herein is described as being employed at a financial institution such as a bank, it will be understood that any business, public or private institution, or individual can employ
5 an outside accounting system to process transactions. When polled, the data may be uploaded per batch or per document to the controller or accounting system.

A brief description of how the process works follows. When checks are utilized in a transaction, the check is tagged with the customer checking account number, the bank's routing number, and the Federal Reserve Region. If multiple
10 banks are involved in the payment, each bank's routing number is tagged to the payment through an endorsement on the back of the check. Alternatively, the system could tag the checks electronically. In other words, the customer checking account number, bank routing number, check number, amount, and Federal Reserve region may be electronically tagged to the check's image. Tagging also occurs on current
15 electronic payments, such as wire transfers.

The ACH or outside accounting system processes information associated with checking accounts which can be held by individual consumers, businesses, trade associations, trusts, non-profit organizations, or any other organization. Documents utilized in the checking account function include checks, checking account deposit
20 slips, debit or credit slips which may be issued by the bank against the checking account, new account application forms, and forms for customers to reorder check and deposit slips. The full image scanner of the present invention may process all of these documents. The documents could be received at a full image scanner located at a teller line, a drive-up window, an ATM or, alternatively, the documents may be
25 received by mail. If received by mail, the bank employee may immediately run the documents through a full image scanner without having to forward the documents to a central location for processing. The outside accounting system maintains a record of all transactions regarding the checking account and balances, and tracks information associated with a particular check.

30 Various other types of documents may be utilized by a bank. For example, a bank may maintain a trust for an individual, such as a retirement trust account. An outside accounting system can maintain all types of information regarding these types of accounts, such as account balances, interest earnings, and maturity dates.

bank to which the image file belongs can be easily recognized by any point in the network to which the scanners are attached.

A field 151 may contain the account number for the check extracted from the image of the check, a field 152 contains data indicating the owner of the account, a field 154 represents the amount of the current transaction which was applied to the file 140 by the scanner, a field 155 contains payee information, and a field 156 indicates check number. It should be recognized that the fields illustrated are not inclusive of all possible fields and types of information which can be stored in the image file 140. Indeed, other types of information can be stored as can pointers to other files having, for example, further information relating to the customer. For example, in the case of payment coupons, the fields may include the customer utility account number. In some cases, it may also be useful to read the memo line of the check. Also, it is contemplated that an operator or the image processor may fill in some of these fields. For example, in the embodiment of the present invention which only requires the customer to sign the document, the payee field and amount field may be added to the image before it is processed. The format of the file is standardized for ease of processing, *i.e.*, using .tif or .jpg. This allows other software to process the information in image files for use by the merchant or financial institution.

Referring now to FIG. 8, the operation of the scanner according to one embodiment is now described. At step 110, an image is obtained of the end-most portion of a reverse side of a check, the portion which contains the customer's endorsement. At step 112, this image is stored in an image file. At step 116, the image of the front side of the check (or other document) is captured. For example, payee information, such as the name of the retail store, bank name, and account number, can be determined from this image data, as discussed in step 120. At step 118, the image may be stored in the same image file mentioned in step 114.

At step 120, the information from the image of the endorsement which was captured and stored in the image file may be processed. For example, the customer's name and signature may be identified. From the name information, signature verification can occur. The OCR software may then compare the signature on the check with the signature on file for that particular account. With the name identified, other information concerning the customer, for example, address and phone number, can be determined.

Also at step 120, the information obtained in step 116 is processed, and information such as MICR information, payee, and bank name is optically obtained from the image data. It is one aspect of the present invention that image data containing the MICR data is optically obtained, rather than magnetically reading the MICR data. This is not to say that MICR data could not be determined using a
5 conventional MICR data magnetic reader, as is known in the art, together with a full image scanner. From the image of the MICR line, the data encoded can be extracted, such as by conventional character recognition methods.

At step 122, the transaction amount, keyed in by the merchant, is added to the
10 image file. The amount may be keyed directly into the scanner or input into the scanner from an external source, such as a cash register. Also, the amount can be captured from the image file and compared to the keyed amount at step 123. The amount may be captured from either the courtesy amount, which is the numeric amount or the legal amount which is the written out dollar amount. At step 124 the
15 image file is added to a batch of files to be queued. At step 126, it is determined whether it is time to transmit the next group of image files, which may be multiple check images (a batch) or a single check image. If the answer is affirmative then, at step 130, the batch of image files is transmitted. These image files are transmitted to an ACH processing center. If the answer at step 126 is negative then, at step 128, the
20 system begins processing the next transaction.

Referring now to FIG. 9, another embodiment of the scanning system of the present invention is described. A controller 160 is coupled to an outside communication channel 162. The purpose of the controller 160 is to direct the operation of the scanning system as described below. The controller 160 is coupled to
25 a terminal and keyboard 164 and a terminal and keyboard 166. The terminals and keyboards 164, 166 allow a user to access information which is stored in a memory 161 which is coupled to the controller 160.

The controller 160 is coupled to an internal communications channel 168. The internal communications channel 168 is coupled to scanning arrangements 169a,
30 169b.

The scanning arrangements 169a, 169b comprise, respectively, debit card readers 176, 178, printers 174, 180, MICR readers 172, 182, and image scanners 170, 184, and are coupled to a terminal and keyboard 186, 188, respectively.

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Image scanners 170, 184 may be of the type having one scanhead described above. Alternatively, scanners having two scanheads may be used as described below. The image scanners obtain a full image of the document, and the OCR software may be programmed to analyze the full image or to analyze only specified fields. For example, with a check, the OCR software may be programmed to read an image of the endorsement fields of the check and the amount fields of the check.

The memory 161 stores information obtained via the scanning arrangements 169a, 169b. The information is stored in a database in the memory 161 and may be in the format of an image file. The information contained within the database is information obtained by the scanning arrangements 169a, 169b and would include, for example, information from scanned checks (signatures, identity of check writer, amount), MICR data obtained from the MICR readers 172, 182, and information obtained from the debit card readers 176, 178.

The controller 160 has software which processes information obtained from the image scanners 170, 184. For example, this software is used to obtain signature information (*e.g.*, identify the signature by name) from the image data or read the amount data from the amount field of the check if the document is a check (*e.g.*, via OCR software).

The MICR readers 172, 182, if used, magnetically obtain MICR data from the document (for example, the check) and report this information to the controller 160. The printers 174, 180 are used to print information on the document, for example, the ACH agreement. Control of the printers is directed from the controller 160 although, alternatively, control can also originate from the operator or clerk at the terminals and keyboards 186, 188.

As mentioned above, the terminals and keyboards 186, 188 are coupled to the scanning arrangements 169a, 169b. The purpose of the terminals and keyboards 186, 188 is to allow operators to access information either scanned in from one of the scanning arrangements or to access information contained in the memory 161. Alternatively, the terminals and keyboards 186, 188 may be used by a customer to enter information or to view a subset of the information stored in the memory 161. For example, the keyboards and terminals may be used to change an amount, search for a particular entry, and view any duplicate images.

Referring now to FIG. 10, one embodiment of the processing operations performed on the image files is now described. At step 602 the system determines

whether a new image file is to be added to the database. If the answer at step 602 is negative, execution continues at step 610 as described below. If the answer at step 602 is affirmative, then execution continues at step 604.

At step 604, the system obtains the image from one of the remote scanners.

5 Next, at step 606, the system then creates the image file in the format specified above,
for example, in connection with FIG. 7. As stated above, the image file may be of a
standard format that is recognizable by all elements of the system. Also at step 606,
the image file is added to the customer database at the remote site. Although,
according to one embodiment, the image file is added to the database at the remote
10 site, the image file can be transferred to a central site, such as the site of the financial
institution, for storage. In yet another alternative, the image file can be stored at both
the remote site and the central site.

Next, at step 608, any needed information is added to the image file. For example, system-related information for indexing purposes may be added to the file.

15 Also, housekeeping or formatting information may be added to the file. For example, any information, such as originating location, customer information, demographics, store number, and audit/control numbers, added by the operator or read by the OCR software may be added to the image file.

At step 610, the system determines whether any additional processing is to be accomplished. If the answer is negative, the operation is concluded. If the answer is affirmative, then execution continues at step 612. It should be noted that the additional processing performed can be automatic, on a case-by-case basis, or a mixture of both types. For instance, every time an image file arrives, it should be added to the database. Periodically, reports can be created specifying the activities of a particular customer, a group of customers, or a category of customers. For instance, if the database contains information concerning the customer's ages, a report can be created giving the spending activities of customers of a particular age. Also, the brand names or categories of merchandise purchased by the customer may also be part of the database. The image file and information regarding this can be collected and compared against all customers and customers who meet certain predefined criteria, for example, age, income, or residence. The software used can be custom-designed or any of the commercially available software as is known in the art.

At step 612, this processing occurs. When the processing is complete, execution is complete.

Another embodiment of a scanning system is now described. As illustrated in FIG. 11, an input receptacle 316 is provided to receive documents deposited by an operator. As stated above, by "documents," it is meant to include checks, coupon and loan payment documents, food stamps, cash tickets, savings withdrawal tickets, check deposit slips, savings deposit slips, bank notes, and all other documents utilized as a proof of deposit at financial institutions. It is also meant by the term "documents" to include loan applications, credit card applications, student loan applications, accounting invoices, debit forms, account transfer forms, and all other types of forms with predetermined fields. A transport mechanism 318 transports the documents from the input receptacle 316 past a full image scanner 312 as the documents are illuminated by a light (not shown). The full image scanner 312, such as described above, scans the full image of the document, recognizes certain fields within the document, and processes information contained within these fields in the document, such as extracting data from the images of the documents. For example, OCR software may be used to extract data which can be stored in ASCII or other text formats. The system may also be used to capture any document image for electronic document display, electronic document storage, electronic document transfer, electronic document recognition (such as denomination recognition or check amount recognition) or any other processing function that can be performed using an electronic image.

A controller 310 manages the operation of the system. The controller 310 directs the flow of documents from the input receptacle 316 through the transport mechanism 318, past the full image scanner 312, and into an output receptacle 320a. Alternatively, the input and output receptacles may be the same or a plurality of output receptacles may be provided. The transport mechanism may direct the documents through the system in a wide-edge feed manner such that the documents' longer edge is perpendicular to the direction of transport as shown in FIG. 12. Alternatively, the transport mechanism may direct the documents through the system in a narrow-edge feed manner such that the documents' longer edge is parallel to the direction of transport as shown in FIG. 13. The controller 310 also routes information from the full image scanner 312 to an interface 324 which communicates with an outside accounting system (including the ACH processing center) or central office. The controller 310 is also capable of directing information from the outside accounting system through the interface 324 to a communications panel 326. Finally,

first output receptacle 6217a. When the diverter 6260 is in an upper position, documents proceed in the direction of the second output receptacle 6217b.

According to one embodiment, the document processing system 6010 is compact, having a height (H_2) of about 17 ½ inches, a width (W_2) of about 13 ½ inches, and a depth (D_2) of about 15 inches. According to another embodiment, the processing system has dimensions of a height (H_2) of about 18 inches, a width (W_2) of about 13 ¾ inches, and a depth (D_2) of about 16 inches. The evaluation device 6010 may be rested on a tabletop.

While the present invention has been described with reference to one or more particular embodiments, those skilled in the art will recognize that many changes may be made thereto without departing from the spirit and scope of the present invention. Each of these embodiments and obvious variations thereof is contemplated as falling within the spirit and scope of the claimed invention, which is set forth in the following claims.

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